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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,468	02/19/2002	Christopher M. Fender	399483	6678

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EXAMINER	
WHALEY, PABLO S	
ART UNIT	**PAPER NUMBER**
1631	

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11/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/079,468	FENDER ET AL.	
	Examiner	Art Unit	
	Pablo Whaley	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 8-34* is/are pending in the application.

4a) Of the above claim(s) *14-19 and 21-34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8-13 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims Under Examination

Claims 1-4, 8-13, and 20 are herein under examination. Claims 14-19 and 21-34 are again withdrawn. Claims 5-7 have been cancelled.

Priority

Priority to US Provisional Application 60/269,474, filed 02/16/2001 has been acknowledged.

Withdrawn Rejections

The rejection of claims 1-4 and 8-10 under 35 U.S.C. 112, second paragraph, as being indefinite is hereby withdrawn in view of applicant's arguments and amendments to claims 1 and 4, filed 9/04/2007.

The rejection of claims 1-4, 8, 10-13, and 20 under 35 U.S.C. 103(a) as being unpatentable over Qiu et al. (Theor. Appl. Genet., 1999, Vol. 98, p.356-364), in view of Robinson et al. (Revue Nematol., 1988, Vol. 11, No. 1, p.99-107) and Bewig et al. (JAOCS, 1998, Vol. 71, no. 2, p.195-200) is withdrawn in view of applicant's arguments and amendments filed 9/04/2007.

The rejection of claims 1-4, 8-13, and 20 are rejected under 35 U.S.C. 103(a) as being obvious by in view of Qiu et al. (Theor. Appl. Genet., 1999, Vol. 98, p.356-364), in view of Robinson et

al. (Revue Nematol., 1988, Vol. 11, No. 1, p.99-107) and Bewig et al. (JAOCS, 1998, Vol. 71, no. 2, p.195-200), as applied to claims 1-4, 8, 10-13, and 20, and further in view of Borggaard et al. (Anal. Chem. 1992, 64:545-551) is withdrawn in view of applicant's arguments and amendments filed 9/04/2007.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-4 and 8-13 are rejected under 35 U.S.C. 101 because these claims are drawn to non-statutory subject matter. According to the revised Guidelines, a claimed invention directed to a statutory process must result in (1) a practical application by physical transformation (i.e. reduction of an article to a different state or thing), or (2) a practical application that produces a concrete, tangible, and useful result [State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998)], [AT&T Corp. v. Excel Communications Inc. (CAFC 50 USPQ2d 1447 (1999)]. The revised Guidelines also state that the focus is "not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather on whether the final result achieved by the claimed invention is useful, tangible, and concrete."

The instant claims are directed to a method for predicting the soybean cyst nematode resistance of a soybean sample. Claim 1 specifically results in a step of "predicting the soybean nematode resistance...based upon the comparison results." Thus, the claimed method does not result in a physical transformation of matter, as this claimed result directing to "predicting"

encompasses a non-physical method step that may be practiced inside of a computer (i.e. *in-silico*). Where a claimed method does not result in a physical transformation of matter, it may be statutory where it recites a result that is concrete (i.e. reproducible), tangible (i.e. communicated to a user), and useful result (i.e. a specific and substantial). For the above reasons, the instant claims lack a "tangible" result and thus do not recite more than a 35 U.S.C. 101 judicial exception. Therefore, the instant claims are not statutory. This rejection could be overcome by amendment of the claims to recite that a result of the process is outputted to a display, or to a user, or in a graphical format, or in a user readable format, or by including a result that is a physical transformation. The applicants are cautioned against introduction of new matter in an amendment.

Response to Arguments

Applicant's arguments that the Examiner fails to explain why the claims fall within one of the judicial exceptions have been considered but are not persuasive. Contrary to applicant's assertions, the Examiner has previously stated reasons why the instant claims do not recite more than a 35 U.S.C 101 judicial exception in the Office action mailed 5/1/2007 (p.3 and 4) and above. In particular, the instant claims result in a step of "predicting the soybean cyst nematode resistance of the soybean sample" therefore the instant claims lack an explicit tangible result and thus do not recite more than a 35 U.S.C. 101 judicial exception. Therefore, the instant claims are not statutory. ~~For exemplary purposes only, applicant would likely overcome this rejection by amending the claims to recite a step wherein the result of the claimed method is communicated to a user (i.e. real-world result), graphically displayed, or output (e.g. to a user, to a memory, or to another computer).~~ For an updated discussion of statutory considerations, see

the revised Guidelines for Patent Eligible Subject Matter in the MPEP 2106, Section IV (Latest Revision August 2006).

***Claim Rejections* - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 8, 10-13, and 20 are rejected under 35 U.S.C. 103(a) as being obvious over ~~Rutherford (Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p.1447-1463), in view of Qiu et al. (Theor. Appl. Genet., 1999, Vol. 98, p.356-364) and~~ Qiu et al. (Journal of Nematology, 1997, Vol. 29, No. 4, 523-530, in the IDS filed 4/7/2003), in view of Marek et al. (Crop Sci., 2000, Vol. 40, p. 713–716) and Rutherford (Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p.1447-1463). ~~–~~*This rejection is newly applied.*

Qiu et al. (1997) teach methods for preparing soybean seed samples infected with nematodes (p.524, Col. 2). Nematode susceptible and nematode resistant samples are used for experimentation (Fig. 2). A colorimetric assay (p.525, Col. 1, para. 2) and (Fig. 1) is used to determine chitinase activity by measuring the absorbance of soybean root supernatant (i.e. soybean sample) spectrophotometrically at 550 nm. Qiu et al. determine that the chitinase enzyme is associated with nematode resistance and susceptibility in the soybean (Abstract). Qui et al. also show a relationship between organic soybean material (oil and protein), polygenic traits, and SCN resistance [p.357, Col. ¶ 3] and [Table 1].

Qiu et al. do not specifically teach the use of obtaining a spectroscopic scan to provide an assay spectra over a predetermined frequency range comprising near-infrared, as in claims 1, 10, 11, 12, and 20.

Marek et al. teach use of near-infrared spectroscopy (NIRS) for measuring chitinase activity (Abstract and p. 714, Methods and Materials, Col. 1) to determine disease resistance in tall fescue seedlings (Abstract).

Rutherford teaches a method ~~and software (SELECT)~~ for predicting the resistance of sugarcane to *E. saccharina* [Abstract] based on ~~. In particular, resistance ratings are determined for sugarcane clones (p.1449, Determination of Resistance Ratings).~~ NIR spectroscopic scans of ~~organic material obtained from~~ sugarcane samples are obtained over a predetermined frequency range (p. 1449, Near Infrared). ~~and absorbance spectra of resistant and susceptible clones are displayed with resistance ratings (Fig. 1).~~ Spectral data is analyzed using multiple linear regression analysis with a small number of selected wavelengths (p.1450, ¶3 and ¶4) and the SELECT spectral algorithm is used to construct calibration and validation sets for the predictive and (p.1451, Results) and determine detectable chemical differences indicative of resistance or susceptibility (p.1452, ¶3). The model allows for discrimination based on several

difference chemical characteristics including protein (Table 1). ~~Predictions of resistance or susceptibility to *E. saccharina* is established using said calibration sets (i.e. predictive models) comprising integrated individual peak areas (p.1454, ¶2) and (p.1453, Table 2). Predictive models are validated using predicted resistance ratings (i.e. known resistance data) [p.1454, Table 2].~~ The calibration sets are ~~then~~ used to predict resistance and susceptibility by comparing differences in absorbance profiles (p.1454). ~~Qui et al. also show a relationship between organic soybean material (oil and protein), polygenic traits, and SCN resistance [p.357, Col. ¶ 3] and [Table 1].~~

~~Rutherford do not specifically teach a method for predicting soybean cyst nematode resistance of a soybean sample, as in claims 1, 2, 3, 12, 13, and 20.~~

~~Qiu et al. (1999) discloses a method for determining soybean cyst nematode resistance (SCN) based on near-infared (NIR) scans of protein and oil obtained from soybean seeds (p. 358, col.1, Seed protein and oil evaluation section), as in instant claims 1, 2, 3, 10, 11, and 13. In particular Qiu et al. provide soybean seedlings with low protein and oil concentrations exhibiting known SCN resistance, and seedlings with high protein and oil concentrations exhibiting known SCN susceptibility [Abstract].~~

~~Qiu et al. (1997) provide evidence that a specific protein (i.e. chitinase) is associated with nematode resistance and susceptibility in the soybean (Abstract) and suggest further studies utilizing better defined genetic material such as recombinant lines (p.528, Col. 1).~~

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to ~~practice the~~ use the soybeans samples and nematode-resistance marker taught by Qiu et al. ~~predictive method of~~ in combination with the NIRS spectral assay and predictive model taught by Marek et al. and Rutherford, ~~using SCN-resistance and SCN-susceptible soybean samples as taught by Qiu et al. for predicting SCN-resistance in soybean~~

~~samples,~~ since chitinase is a known marker for determining soybean resistance to nematodes, as shown by Qiu et al., and since NIR spectroscopy is a known technique for~~is a well-known tool~~ detecting chitinase activity in seedling samples, as shown by Marek et al ~~for profiling organic material for resistance to parasites, as suggested by Rutherford (p.1448, ¶2) and since Qiu et a. (1997) shows that specific proteins in soybean samples are associated with nematode resistance and susceptibility~~. One of ordinary skill in the art would have been motivated to combine the above teachings in order to improve the prediction of nematode-resistant soybeans since NIR spectroscopy is a rapid and ~~in order provide a~~ low-cost ~~NIR technique for prediction of plant based~~for predicting resistance, as shown by Rutherford~~,~~ (p.1448, ¶5).

~~as shown by Rutherford (p.1448, ¶5), by screening samples for organic material known to be linked to SCN resistance, as shown by Qiu et al. (1997).~~

Response to Arguments

Applicant's arguments that Qiu et al. nor Robinson et al., nor Bewig et al. teaches or suggests the claim limitation wherein the assay spectra obtained from a soybean sample are compared with a predictive model based on spectra data obtained from soybean varieties with known resistance or susceptibility to soybean cyst nematode (claim 1, step b) to predict the SCN resistance based upon the comparison results have been fully considered but are moot in view of the new grounds of rejections.

Claims 1, 8, and 9 are rejected under 35 U.S.C. 103(a) as being obvious over Rutherford (Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p.1447-1463), in view of ~~Qiu et al. (Theor. Appl. Genet., 1999, Vol. 98, p.356-364) and~~ Qiu et al. (Journal of Nematology, 1997, Vol. 29, No. 4, 523-530, in the IDS filed 4/7/2003) and Marek et al. (Crop Sci., 2000, Vol. 40, p. 713–

716), ~~,~~ as applied to claims 1-4, 8, 10-13, and 20 above, and in further view of Borggaard et al. (Anal. Chem. 1992, 64:545-551). *This rejection is newly applied.*

Rutherford, Qiu et al., and ~~Qiu~~ Marek et al. make obvious a method for predicting the soybean cyst nematode resistance of a soybean sample, as set forth above.

Rutherford, Qiu et al., and Marek et al. ~~Rutherford, Qiu et al., and Qiu et al.~~ do not specifically teach natural intelligent algorithms as recited in claim 9. However, Rutherford and Qiu et al. clearly teach multivariate predictive algorithms and discriminatory analysis models, as set forth above.

Borggaard et al. teach the use of neural networks for optimally interpreting NIR spectra for classifying samples [Abstract and p. 546, Section I], as in claim 9. More specifically, said neural networks are used to compare results and predict fat in homogenized meat products using NIR spectral data [Table II] and [Fig. 6].

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the predictive model made obvious by Rutherford, Qiu et al., and ~~Qiu~~ Marek et al. using a neural network model as taught by Borggaard et al., since the use of intelligent algorithms for spectral classification is well known, as shown by Borggaard above. One of ordinary skill in the art would have been motivated to use a network for training and analysis of soybean NIR spectral data since Borggaard (p.550, Section VIII) shows this improves the predictive power of the model by reducing spectral noise.

Response to Arguments

Applicant's arguments that Borggaard et al. do not teach comparing NIR spectra with a predictive model have been fully considered but are moot in view of the new grounds of rejections.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached at 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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